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A REVIEW OF SOME PLANNING PHILOSOPHIES AND REGION 3'S GUIDE TO LAND USE PLANNING.

A REVIEW OF SOME PLANNING PHILOSOPHIES AND REGION 3'S GUIDE TO LAND USE PLANNING

Final Report

Cooperative Agreement 16-282-CA

Development of a Land Use Planning System

To

U.S.D.A. Forest Service

Rocky Mountain Forest and Range Experiment Station

By

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INTRODUCTION

The motivation for proposing this study grew out of a limited exposure to National Forest land use planning in the Southwest Region during 1970 and 1971. At that time the National Forest planning teams operated with very little guidance and spent considerable energy in learning about planning. It seemed, therefore, that a review of planning in other fields might provide information for possible incorporation into a National Forest land use planning system.

After the study was begun it was learned that the Southwest Region had assigned personnel to the task of developing land use planning guides. This fact, coupled with the realization that the objectives of the study were overly ambitious, led to a narrowing of scope. It is hoped, however, that the effort will prove of some usefulness for National Forest land use planning.

OBJECTIVES

The objectives of the study were:

1. To identify planning concepts, techniques and approaches that could be applied to public forest land use planning:
2. To develop a general planning system, incorporating the findings of objective one, that is applicable to the environments and organizational structure typically present in land use planning situations on National Forests.

The scope of the first objective was narrowed to a review of some philosophical and conceptual aspects of planning rather than planning techniques per se. A philosophical view of planning is useful in that it provides an opportunity to consider the larger cultural and intellectual framework within which the planning process fits.

The scope of the second objective was narrowed to a critical review of Region 3's Guide to Land Use Planning (USDA Forest Service 1972). The guide was developed over the past two years by the group mentioned above and represents a great deal of effort and thought. It would be presumptuous to suggest an entirely new planning system even if such a system could have been developed within the financial and personnel limitations of this study.

SOME PLANNING PHILOSOPHIES AND CONCEPTS

It may seem too traditionally academic, perhaps, to begin with a definition of planning. The diverse definitions of planning found in the literature and among planners, however, make it necessary to address the question. A portion of the confusion arises because there are different types and/or levels of planning and a planner's implicit definition is conditioned by the kind of planning he does.

Ackoff (1970, p. 1) defines planning as "the design of a desired future and of effective ways of bringing it about." He goes on to state that planning involves the definition and evaluation of a set of decisions in order that a desired future state is likely to occur. This assumes that what is a "desired future" is known. The planning process, however, is also applicable to the problem of determining desirable future states and/or goals.

Ward (1972) defines planning as how best to alter society. This definition implies a normative approach and the use of planning to consciously bring about social change.

Duerr (1960) draws a distinction between planning and decision making. In his view, the planning process produces a set of alternative means of accomplishing a set of objectives and weights these alternatives. The decision-maker, not the planner, decides which of the alternatives is to be implemented. It may very well be, however, that the planner and the decision-maker are one person, playing both roles.

Ackoff (1970) seems to disagree with Duerr when he states that planning is anticipatory decision-making. The disagreement hinges on the point in the total process at which one chooses to say planning stops. Ackoff takes the planning process through the decision whereas Duerr stops short of the decision.

Actually, planning leads, most often, not to one decision but to a system of interdependent decisions (Ackoff 1970). In fact, it is the necessity of making interdependent decisions to achieve some future state that makes planning a requirement. These sets of decisions are characterized as being too large to handle all at once yet not amenable to being subdivided into independent subsets. Perhaps one of the causes of land use mistakes on National Forests has been the tendency to subdivide interdependent decisions, i.e. multiple-use management has been a concept, not an operational process.

Planning may be viewed as having two systemic properties: 1) it is a process not an act; and 2) it has no natural conclusion or end point (Ackoff 1970). The first property is becoming well recognized in the Forest Service. The second property may be less accepted by Forest Service

practitioners. The continuous nature of the planning process tends to be obscured by the need for action at some time and the setting of deadlines for planning tasks.

I find Ackoff's definition of planning, as the design of a desired future and the means of bringing it about, most useful in a National Forest context.

Philosophies of planning vary from that of the normative, we-know-best, approach to, we'll let the public tell us what to do. Neither extreme, of course, is adequate. Planners most often don't know what is best and the public doesn't have the professional and technical expertise to know what is or isn't feasible.

Traditionally, planners have taken a normative approach or philosophy. Typically, this approach produces a plan that is either accepted or rejected by the voter or the decision-maker. The planner and/or decision-maker utilizing this approach supposedly identifies the public interest and plans for it (Davidoff 1966). The normative approach is rapidly disappearing in urban planning and, at least superficially, in National Forest land use planning.

The basic reason for the "decline" of normative planning is the recognition that identification of the public interest is difficult if not impossible. The Forest Service, as well as other agencies, has attempted, therefore, to increase the level of public involvement in land use planning beyond what was formerly required by law. This movement was spurred by the passage of the National Environmental Protection Act, but it probably would have occurred to some extent in any case.

The pluralistic planning philosophy involves recognizing and attempting to maintain the plurality of values held in our society as they apply to land use decisions (Fein 1966). In practice, the attempt to "discover" and plan for the public interest, a form of normative planning, can lead to planning for the "majority". Such planning does not recognize the basic fact that there is no single public interest; we are not a monolithic society.

The basic question is how can planners have the pluralistic nature of our society properly reflected in the planning process? The wrong answer is to plan for the majority. The question has no easy answer at present. Perhaps the least that should be done is to recognize pluralism, its value as a humanizing element in our society, and to listen to various elements within our society (Fein 1966).

Fein (1966) suggests advocate planning as a means of implementing a philosophy of pluralistic planning. In advocate planning the various interest groups express their values in the form of plans. The full development of advocate planning would find planners acting as professional advocates, criticizing plans proposed by public agencies and preparing alternative plans.

Advocate planning in relation to National Forest land use planning is most likely to involve areas of high national interest or of high interest and value to particularly well organized elements of our national society. Many National Forest areas fall somewhere between these two situations. In these cases the need for planners who recognize pluralism and who know how to listen to the public is especially strong.

Another approach to pluralistic planning is through the use of utopian thinking. Utopian thinking is much maligned, but Jarvie (1966) uses four critical arguments against utopian thinking as a framework for discussion and justification of the approach. The first argument is that we cannot know what the future will be so there is no use in thinking about it. This argument has been used against planning in general, not just the utopian approach to planning. The aim of utopian thinking is to tax the imagination so as to maximize the development of alternatives and to anticipate problems. Jarvie is careful to point out that he is defending critical utopian thinking. His position is that a planner should be bold and free in thinking through ideas but constrained in carrying them out. A planner is putting limitations on future choices available to future generations and he needs to think about them in order to do his job in a critical manner.

Second, the utopian approach is criticized as being too fanciful and remote and we would be better off to concentrate on the trends shown by available data. To be hardheaded and concentrate on what we "know" is also fanciful in that we are hypothesizing that things will go as they now seem likely to go. If planning is defined as altering things to achieve some desired future, then, by definition planning must be utopian. Public land management has been plagued with new situations that could not have been predicted by the hardheaded approach. Since there really are no clear cut choices, the planner should proceed to implementation in a piecemeal fashion but plan and think in a wholesale fashion.

A third criticism of utopianism is that the utopias envisioned and implemented are an imposition of utopian dreams. Planners may become so

involved in their utopias and concepts that criticalness of the concepts and terms in which they are set is lost. Planners must be critical of their dreams otherwise the dreams become aimless. Disciplined criticalness is necessary in using a utopian approach.

The fourth criticism is that utopias are produced by a selective and dogmatic imagination; that they are naive and optimistic. Critics expressing this view tend to be pessimists, recognizing no middle ground (Jarvie 1966). There are three possible ways to look at the future. First, we can say things will go as they have. This is a conservative prediction of the future. Second, we can say that certain tendencies will become dominant. This is an indicative prediction. Third, we can say we don't know what will hapen but maybe such and such will happen. This is a speculative prediction. Jarvie suggests using the third way, but in a critical manner.

The emphasis of Jarvie is on being critically utopian. This can be difficult and he suggests some ways of achieving it. First, fully trace out the ramifications of whatever is proposed to determine whether the "utopia" is self-defeating. Second, check to see if the "utopia" will destroy certain things of value and whether there are conflicts with other things considered important. Third, ask whether the "utopia" actually solves the problem. Fourth, ask whether the "utopia" is an accord with present facts (Jarvie 1966).

REGION 3'S GUIDE TO LAND USE PLANNING

As mentioned previously, the Southwest Region of the Forest Service developed a planning guide[1] during the study period. (USDA Forest Service 1972) An outside, critical review of the Guide seems useful for strengthening future editions.

In the Guide (USDA Forest Service 1972, p. 3), the basic land use policy relating to the National Forest lands is stated as:

> "Based upon the inherent capability of the land to produce resources and meet public needs, allocate land to production of resources in a way that will:
>
> 1. Protect soil productivity
> 2. Produce renewable resources on a sustained yield basis.
> 3. Have the least impact on the environment."

This policy statement is a goal statement with constraints. Stating the constraints in a positive manner produces an emphasis such that the goal, meeting public needs, appears to be a constraint and the constraints appear to be goals. As Alston (1972) has pointed out, the constraints listed are considerations that have come to be included in the goal of maximizing social welfare. The constraints listed are also means to the achievement of the goal.

The basic goal does appear to be maximization of social welfare. The later discussion in the Guide on economics and multi-objective planning is

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[1]Hereinafter referred to as the Guide

further indication that national social welfare is of primary concern. In this sense, the statement is normative in nature.

The nine basic assumptions of the planning process presented in the Guide are elaborations of the land use policy statement and many of the assumptions are redundant. The first assumption is a restatement of the three constraints of the policy statements. The second assumption is recognition of ecological complexities. The third assumption restates the goal of land use as being the long term public interest (social welfare). Assumptions five and six seem to be restatements of two and three. The seventh assumption seems to be a restatement of assumptions one, two, three, five and six.

The fourth assumption states that current land uses may not necessarily be continued. The ninth assumption indicates that changes in present land uses will be phased over a specific period of time. These two assumptions alert the public and present users of National Forest lands that the Forest Service will not be bound by the past in looking to the future, but that changes in uses will be made such that dislocations are moderated.

The eighth assumption is especially significant because it is the first indication in the Guide that land use planning is to be followed by resource planning. It is entirely possible that the resource planning process could provide information indicating a need for adjustment in land use allocations. Some feedback mechanism between resource planning and land use planning should be provided so that needed adjustments can be made.

As usual in natural resource management, there is a confusion of the terms land use, resource, and product. This confusion occurs because, viewed from one point in the production process, a thing is a resource and, viewed from another point, it is a product. A use of land may produce a resource or be a product (dispersed recreation for example).

The four basic parts of the planning process are inventory, evaluation, definition of alternatives, and the unit plan (USDA Forest Service 1972). As an aid to understanding, a flow chart of the planning process was developed from the text and material in the Guide (Figure 1). Based on an inventory of the planning unit and an evaluation of the inventory data, Land Response Units (LRU) are delineated so that a reasonable homogeneity of response to manipulation can be expected within units. Each unit is characterized by its sensitivity, as defined by slope, erosion hazard, and runoff potential; and by its capability, as defined by its moisture, nutrient, and temperature regimes. The sensitivity ratings are based on quantifiable physical variables, but are expressed as arbitrary categories. These categories are used to define environmental constraints. The capability ratings are based on quantifiable physical-biological variables, but are also expressed as arbitrary categories. The capability ratings can lead to ratings of the productivity of land response units for various resources. The sensitivity and capability ratings represent a basis for developing crude production relationships and identifying feasible management alternatives.

The next important step is the allocation of land response units to one of three Multiple Use Classes (MUC): commodity products, amenity

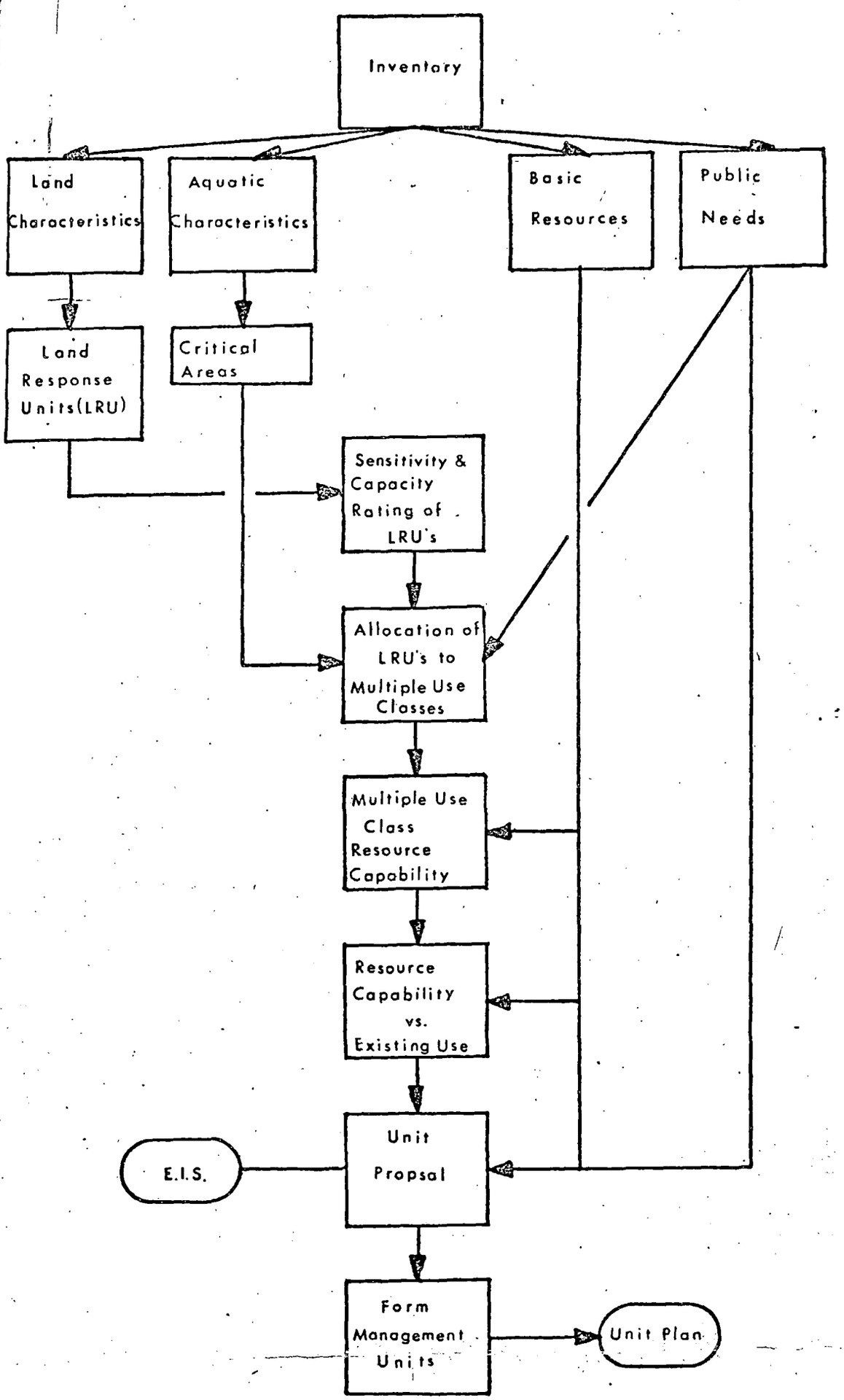


Figure 1. Planning process flow chart.

values, and commodity-amenity values. Allocation is based on the sensitivity and capability ratings, critical resource determinations and previously determined use zones. The decision framework for allocations of Land Response Unitsto Multiple Use Classes is shown in Figure 2.

The text of the Guide regarding the allocation of the LRU's to the three MUC's is not clear. On page 51 it is indicated that the LUR's will be allocated to one of the three MUC's but that further analysis is required to refine allocation within the third MUC, the commodity-amenity class. On page 54 a decision "key" for allocation is given. In following the key through, as shown in Figure 2, an LRU will be allocated to either the commodity or amenity class in every case. Elsewhere in the Guide and in the Mogollon Rim Area Land Use Plan Draft Environmental Statement (1974), however, it is indicated that the assignment of production or resource emphasis to LRU's in the commodity-amenity class does not become more specific in the unit plan.

How public needs or relative demands for various resources are to be taken into account is not clear. Because of this lack of clarity there will be a tendency to assign uses and management alternatives simply on the basis of physical-biological productivity and sensitivity. The document does not make clear that what should be done with a piece of land depends, in addition to its productivity and sensitivity, on the state of technology and economic factors. Simply because a piece of land is highly productive, physically and/or biologically, in some given use, does not necessarily mean it should be managed for that use. Highly productive buggy whip makers are no longer finding employment.

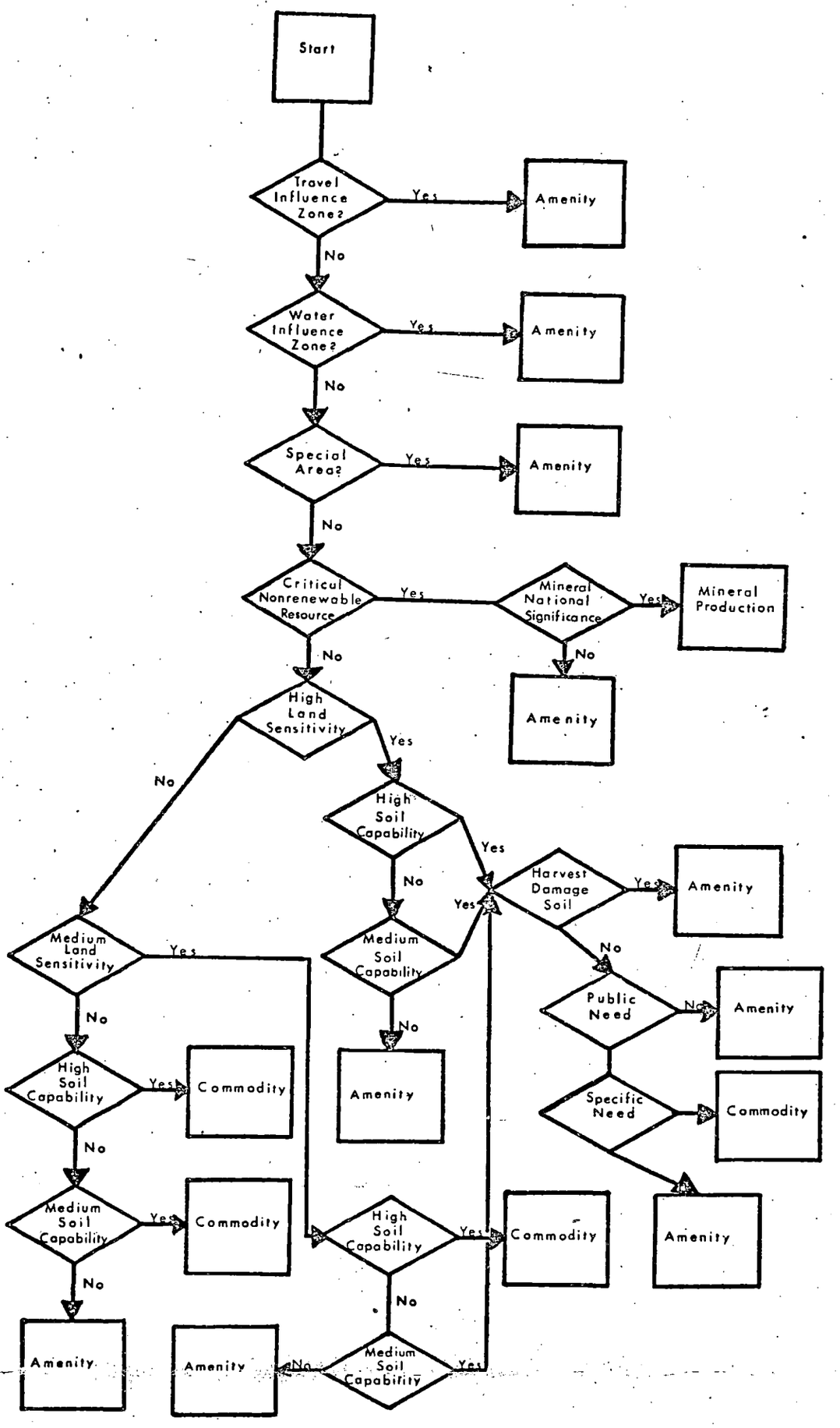


Figure 2. Decision key for allocation of Land Response Units to Multiple Use Classes.

The third major part of the planning process is the determination of management alternatives through an analysis of the range of alternatives within each of the three multiple use classes. An environmental statement is used as the organizational vehicle for this analysis. In this part, under the heading "Basic Assumptions and Objectives for the Planning Unit," the land use policy is restated, in slightly different terms, as the basis for the assumption (USDA Forest Service 1972, p. 57) "that it is the land manager's responsibility to evaluate basic land and resource data and separate the land into categories (Multiple Use Classes) in order to meet the constraints established by Congress through enabling legislation." This assumption is taken as the basis for the following "objective" (USDA Forest Service 1972, p. 57): "The sensitivity of the land to man's use and the capability of the soil to produce resources will become the basis for determining multiple use classes that will become the constraints on the type and extent of land use that will be allowed on a particular piece of National Forest land."

This "objective" is an explanation of how constraints on land use will be determined, not an objective. Its relationship to the other objectives stated in the section on public needs, (1) National Economic Development, (2) Environmental Quality, and (3) Regional Development, is not given.

In this third part, the commodity and amenity value capabilities of the multiple use classes are expressed as acres of land rather than units of the products and/or services. In addition, the example given indicates that acreages in each commodity or amenity category are mutually exclusive. Hopefully more refinement will occur in the resource planning phase.

The fourth major part of the process is preparation of the unit plan, a document. Five sections of the document are outlined. The second section, "Objectives," is to include the objectives that were initially established for the planning unit. The only mentions of objectives prior to this section have been discussed above. If objectives more specific than those discussed above are to be determined for each planning unit, the process of determination is not outlined.

Management units within the planning unit are to be defined and the resource or use to be emphasized in each is to be stated. Then the management decisions are to be stated showing how each of the other resources or uses will be constrained in coordinating their use with the one to be emphasized. It would seem this section should also include a discussion of how the resource or use to be emphasized will be managed.

After reviewing Region 3's Guide to Land Use Planning one is left with the impression that the process will produce a set of constraints within which resource planning will take place, a description of the economic situation, and an indication of public needs.

If resource planning processes are to be those traditionally used for the various functional responsibilities on a National Forest, the guides provide minimal progress beyond the previous multiple-use management planning process. If the resource planning process, however, is to be a modification of functional planning or a newly developed process, the interface between land use planning and resource planning is not clear. There should be, as mentioned previously, feedback between the resource planning process and the land use planning process.

The guide is very strong with respect to measurement and analysis of the physical and biological aspects of land resources. This is to be expected since these variables are more easily measured than the political, social, and economic variables. More effort needs to be made to achieve a synthesis of the physical-biological and the socioeconomic aspects of planning situations in the planning process.

One is also left with the impression that the thrust of the planning process has been biased towards resource protection at all costs. The constraints of the land use policy statement seem to have been of greater importance in the development of the guides than the goal stated in the statement--"...to produce resources and meet public needs,..."

The use of a goal oriented planning framework for the development of the Guide would have served to put constraints in a less dominating perspective and make clear to the users of the Guide that planning is, in fact, goal oriented. Three such frameowrks that might have been used are: linear programming; benefit-cost analysis; Duerr's four stages of social planning (1960, p. 515); or Alston's (1972) heuristic model, FOREST.

The essence of planning is the setting of goals and objectives and determining the best means of achieving them. If recognized, this very vital point does not come through in the Guide. Instead, the process seems to be one of defining ever narrower sets of constraints until only one alternative is possible (Figure 2).

As stated previously, there is a need for synthesis of the physical-biological and socioeconomic aspects of planning in the planning process. Further development of the Guide will probably address this problem. A

number of approaches leading to synthesis could be used. Two that might be considered, singly or in combination, are linear programming and simulation. Each has advantages and disadvantages. The simulation approach typically does not involve optimization. Hence, combining a simulation model with an optimizing model is often useful. A simulation model, however, is complex, has large data requirements, and requires a great deal of time to develop.

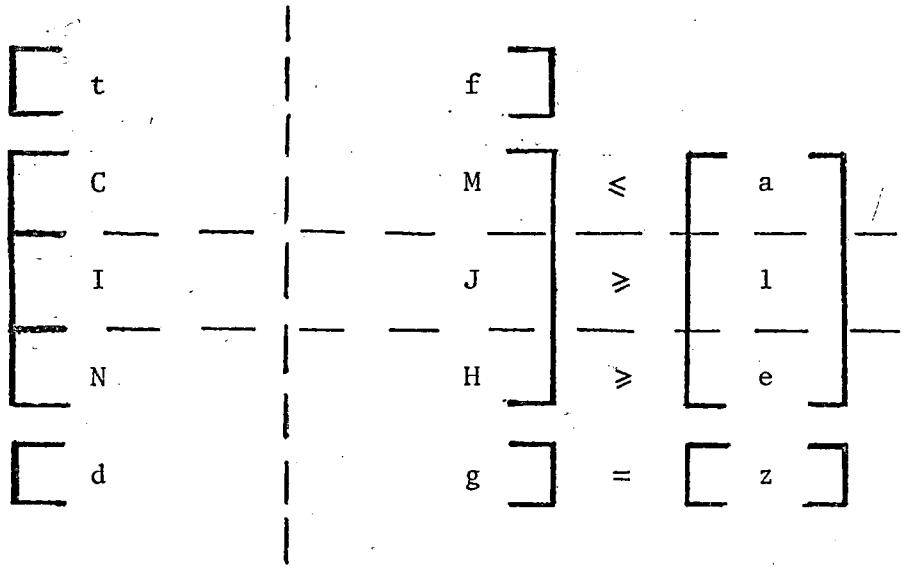
In Region 3 the linear programming approach has a distinct advantage because of the current development of a linear programming (LP) model for the Salt-Verde River Basin by the Rocky Mountain Forest and Range Experiment Station. Although LP models contain certain assumptions contrary to strict reality (as does the Guide), they do provide a more complete framework for decision-making than is presented in the Guide. They make possible the explicit consideration of the influence of various constraints and resource values (public demands) simultaneously rather than through the dichotomous approach shown in Figure 2. LP models also make possible the consideration of multiple objectives whereas benefit-cost analysis, another possible approach, lacks this capability. As will be shown, the inventory portion of the process described in the Guide and the establishment and rating of the LRU's are well suited to a linear programming approach.

A further advantage of the LP approach, as well as other optimizing models, is that it allows the planner to consider various levels of investment. One of the important drawbacks of the current Guide is that no consideration is given to the effect of investment on productivity.

To show the usefulness of an LP approach a general model developed by Jameson, D'Aquino, and Bartlett (1974) is presented.

The LP model is an optimizing model. For example, a justifiable objective would be to maximize the present value of gross revenues minus variable costs within land and resource use constraints. This may be objected to because many of the products and uses of public lands do not produce revenue for the National Forests. These nonrevenue producing products and uses, however, are taken into account in the model.

The LP model partitions the management situation in such a way that the components of the decisions are clearly distinquished. This characteristic alone is very worthwhile. The components of the model are shown below using notation identical to that of Jameson, et. al. (1974).



z = final value of objective

d = management costs

g = product or use revenues

t = management alternatives

f = products or uses

a = amounts of fixed resources

C = linkage relationships between management alternatives and fixed resources

M = null or zeros to provide mathematical conditions for solution

l = the lower limit of renewable resources

I = production rates of renewable resources

J = utilization rates of renewable resources

e = quantity of nonrevenue product or use requirements

H = linkage relationships between products or uses and requirements

N = null or zeros to provide mathematical conditions for solution

The above model is applied to each homogeneous unit of production. In terms of the process described in the Guide a unit would be LRU's of like sensitivity and capability ratings. This makes possible the use of the simple view an LP model takes of the production relationships involved in a natural resource management situation and concurs with the view taken in the Guide.

The 't' portion of the model is simply a listing of the management schemes to be considered. The 'f' portion is a list of uses or products.

The 'a' quantities are expressed in physical units such as acres of land available in a given unit and/or dollars to represent a fixed budget level. The model could be rerun for each of various budgets levels. The 'C' portion explicity links the management alternatives, 't', to the fixed resource inventory, 'a'. Each management alternative utilizes

some of the fixed resources, but the amount of fixed resources available cannot be exceeded. For example, the acres of land devoted to timber production plus the acres of land devoted to grazing cannot exceed the total acres of land in an LRU. If 'a' represents a budget constraint, the 'C' portion represents the cost of each management alternative.

The 'l' of the model represents the lower limit of renewable resources. 'I' shows the production rates of the renewable resources, i.e., timber growth, water yield, forage production, etc. 'J' is the rate of utilization of each use of each renewable resource. The 'I', 'J', and 'l' portion of the model provides that production rates (I) minus utilization rates (J) must be equal to or larger than some minimum lower limit (l). When the level of production is satisfactory this limit would be zero. If, however, it were deemed desirable to raise the level of timber growing stock or if a range was considered overgrazed, the 'l' for timber and forage would be given a value greater than zero. A possibility in timber management is that the level of growing stock should be lowered to optimize timber returns and in this case 'l' would be set less than zero.

The 'e' portion of the model expresses the product or use requirements. The 'N', 'H', and 'e' portion of the model is not typical of LP models. The usual LP maximizing model addresses the question of how much of various products should be produced given resource constraints and the prices of inputs and products. This usual approach requires price or value coefficients for each of the products or uses. In public land management some of the possible products are difficult to value

because of their nonmarket nature. The approach of this model avoids the necessity of establishing value coefficients for all products, but does require that estimates be made of the minimum output levels of the various nonpriced products or uses. This approach is essentially that taken in the Guide whereby portions of LRU's falling in Travel Influence Zones, Water Influence Zones, are immediately assigned to the amenity multiple use class. Certain political and public relations imperatives can be worked into the decision framework through this approach as well. The 'H' portion provides the linkage between uses and use requirements, 'e'.

'Z' is the final value of the objective, in this context the present value of gross revenue less variable costs. The 'd' are management costs that can be allocated exclusively to specific management alternatives. The 'g' portion contains the gross revenues from those products or uses for which users pay.

The advantages and relevance of this model are:

1. Different budgetary levels (investment) can be examined.
2. Resource and land constraints are taken into account and the present system of establishing LRU's fits the model.
3. The opportunity costs of setting various minimum requirement levels for nonrevenue producing uses can be determined.
4. Once set up, the model can be used to respond quickly to "what if" questions from the public.
5. Relative values of revenue producing uses are taken into account.
6. Perhaps the most important advantage is the overall one of providing the planner with the opportunity to test the sensitivity of decisions to value coefficients, requirements set for nonrevenue uses, and levels of investment.

It should be emphasized that the model does not put the planner in the straight jacket of "economic" optimization. Judgement is required and the decision is not necessarily clear cut or preordained.

In summary, such a model could be put in place rather quickly with the aid of the Rocky Mountain Forest and Range Experiment Station without requiring a change in the basic inventory and LRU rating system as now used by the Region. Application of the model would require more analysis of the management of each use or product than is now included in the Guide. This effort, however, would apparently take place, in any event, in the resource planning phase for implementation of the plan. The use of the LP model would provide the needed interface between land use planning and resource planning.

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